

REMARKS/ARGUMENTS

In response to the Official Action mailed April 22, 2005, Applicants amend their application and request reconsideration. In this Amendment claim 2 is cancelled, leaving claims 1 and 3-14 pending.

There are three pending independent claims, claim 1 directed to the infrared detector and claims 10 and 11 directed to methods of making the infrared detector. Each of the three independent claims has been amended. All of the claims have been reviewed, and amended, where appropriate, to make the claim language uniform. These amendments are non-substantive.

Amended claim 1 describes the infrared detector as having the infrared absorption layer positioned to overlap the heat-insulating supporting legs, when viewed along a direction of infrared rays that are incident on the infrared absorption layer. The amended claim explains further what appeared in the final paragraph of the examined claim 1, namely that there are two cavities in the claimed infrared detector, one between the temperature sensor and the heat-insulating supporting legs and another cavity between the heat-insulating supporting legs and the infrared absorption layer. A part of the limitation added to claim 1 was extracted from claim 2, resulting in the cancellation of claim 2. Further, support for the remainder of the amendment of claim 1 is found in the patent application, for example, at page 11 in lines 9-24 as well as many of the figures.

Claims 10 and 11 have been similarly amended and the language of the claims has been made consistent. The limitation added at the end of each of claims 10 and 11 specifies that in removing all of the sacrificial layers, two such layers in the method according to claim 10 and three such layers in the method according to claim 11, three cavities are produced. One cavity is between the substrate and the temperature sensor. Another cavity is between the temperature sensor and the wiring layer, and the third cavity is between the wiring layer and the infrared absorption layer. This further explanation is supported in the same passage of the specification previously cited, at page 11, lines 19-24, as well as in the illustrations of the process steps in Figures 6A-6E and Figures 16A-16E.

Claims 1-5, 7, 8, and 10-13 were rejected as anticipated by Kimata (U.S. Patent 6,465,784). This rejection is respectfully traversed, particularly in view of the claims now presented.

In applying Kimata, the Examiner directed attention to Figure 10 of Kimata. It is readily apparent by studying that figure and similar figures, as well as the related disclosure in Kimata, that Kimata cannot anticipate any claim now pending.

It is difficult to correlate elements in Figure 10 of Kimata with claim elements in claim 1. It appears the Examiner has compared, as a single item, the layers and other elements identified by Kimata with reference numbers 110, 120, 31, 32, 3a, and 3b, as corresponding to the heat-insulating supporting legs of claims 1 and 3-9. Applicants respectfully disagree with this comparison.

In Kimata, the center portion of the structure cited by the Examiner, i.e., near wiring 3a and 3b, cannot be part of any structure characterized as supporting legs. Rather, that part of the cited structure is clearly designated by Kimata as part of the temperature sensor 301 that is delineated by the ellipse shown in Figure 10 of Kimata. Thus, unlike the invention as defined by amended claim 1, the "heat-insulating supporting legs" 21 and 22 of Kimata do not overlap the temperature sensor 301 along the direction of incident infrared rays. Rather, those supporting legs are attached to a side surface of the temperature sensor 301. Therefore, because of the absence from Kimata of the overlapping structure of the heat-insulating supporting legs and the infrared absorption layer, when viewed in a direction along incident infrared rays, Kimata cannot anticipate any of claims 1 and 3-9.

The invention as defined by claims 1 and 3-9 is further distinguished from the infrared detector of Kimata because, in Kimata, there is no cavity between the elements compared in the rejection to the heat-insulating supporting legs and the temperature sensor of claim 1. Rather, the central portion of the middle layer within the structure shown in Figure 10 of Kimata that overlaps the temperature sensor 301 fully contacts that temperature sensor. Thus, there is no thermal separation of any kind, such as produced by the cavity according to the invention, between Kimata's "supporting legs" and temperature sensor. For this additional reason, Kimata cannot anticipate any of claims 1 and 3-9.

Claims 6 and 9 are dependent claims depending from amended claim 1. These two claims were rejected as unpatentable over Kimata in view of Ishikawa (U.S. Patent 6,483,111, hereinafter Ishikawa). This rejection is respectfully traversed.

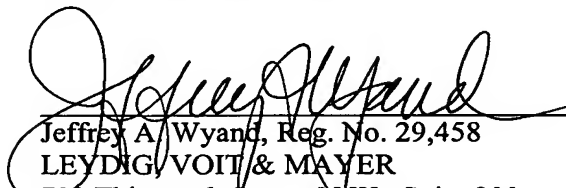
It is apparent that the rejection of dependent claims 6 and 9 is founded upon the assertion that claim 1 is anticipated by Kimata. Since that assertion can no longer be supported, the rejection of claims 6 and 9 fails upon the withdrawal of the rejection of claim 1. Further comment on this secondary rejection is therefore not required nor provided.

Claims 12-14 depend from claims 1, 5, and 13, respectively. These claims are not anticipated by Kimata because claim 1 is not anticipated by Kimata. Further, claim 14 was rejected as unpatentable over Kimata in view of Gooch et al. (U.S. Patent 6,690,014, hereinafter Gooch). This rejection is respectfully traversed because, like the rejection of claims 6 and 9, the propriety of this rejection depends upon the anticipation of claim 1 by Kimata. That rejection based upon Kimata cannot be properly maintained so that the rejection of claim 14 must also be withdrawn.

The two independent method claims, claims 10 and 11 were, as already stated, rejected as anticipated by Kimata. As already mentioned in describing the amendment of claims 10 and 11 and their respective final paragraphs, in the method according to the invention, either two or three sacrificial layers are removed and three cavities are formed. It is apparent, even by visual inspection of the figures of Kimata, that no structure disclosed there includes three such cavities providing important separations, i.e., thermal isolations, between three different elements. This thermal isolation is important in achieving increased sensitivity of the infrared detector. It might be tempting to assert that certain elements within Kimata, namely 2a-2d, are cavities within the supporting leg structure meeting the amended claims. However, the specification of Kimata shows that those areas are actually solid silicon areas that are doped in order to achieve a particular conductivity type. Accordingly, because a fundamental step in the process as defined by both of amended claims 10 and 11 is missing from Kimata, the rejection of those claims must likewise be withdrawn.

Reconsideration and allowance of the remaining claims, claims 1 and 3-14 are earnestly solicited.

Respectfully submitted,


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